REMARKS/ARGUMENTS

Claims 1, 3-11, 15, 17-31 and 33-34 are active in this application, claims 2, 12-14, 16 and 32 having been cancelled. Claims 1 and 19 have been amended to specify that the present method requires that the drying step be performed at a temperature of from 50-90°C. This upper end of the temperature range is supported by the specification at page 7, lines 20-23. No new matter has been added by these amendments.

The present invention relates to a method for providing antimicrobial properties to a composite material. The present method provides several important improvements and advantages compared to conventional methods for antimicrobial treatment.

(I). the present method provides the ability to complete the treatment using a drying process at temperatures of no more than 90°C. This is a critical difference relative to the art. In particular, the methods for providing antimicrobial treatments described in the various references cited by the Examiner indicate that significantly higher temperatures are required to effect antimicrobial treatment on an article, with temperatures being typically on the order of 130°C or higher. This is often followed by a heat treatment at even higher temperatures. That is NOT the case in the present invention. In fact, the present invention requires maintaining the temperature of the drying step to no more than 90°C. Applicants have found that by maintaining the temperature at no more than 90°C, it is still possible to dry the item, while permitting the antimicrobial agent to dry on the surface of the article, reacting NOT so much with the article's surface, but rather reacting primarily with itself to form essentially a coating on the surface. This coating provides the antimicrobial properties which are long lived.

(II). Further, because at the lower temperatures the reaction with itself is prevalent over the reaction of the antimicrobial agent with water vapor and the subsequent reaction

with the article surface at the elevated temperatures of the prior art, the present invention provides the ability to treat essentially ANY surface, including surfaces such as glass.

(III). The present invention also provides the ability to reuse the spent treatment liquid to treat multiple items sequentially. Conventionally, when articles are treated for antimicrobial properties, the spent liquid has been discarded. That is not necessary with the present invention, as the spent liquid contains considerable quantities of the antimicrobial agent still present, and requires no special treatment of the spent liquid for its reuse.

(IV). The present invention provides antimicrobial protection which works on contact, which means that the composite yarns/fabrics/articles treated with the present invention method have antimicrobial protection against essentially all microorganisms, even those such as methicillin resistant Streptococcus aureus (MRSA) and others which have mutated to be resistant to conventional antimicrobial treatments. The preferred embodiment of the present invention method provides a coating on the yarn/fabric/article having the organic antimicrobial agent possessing a long chain hydrocarbon group which acts like a "spike", penetrating the cell wall of the microorganisms and thus killing them on contact. Conventional antimicrobial agents typically act otherwise, by leaching the active agent which enters the cell and affects the DNA of the microorganism, disrupting reproduction. This requires the microorganism to undergo at least one round of cell division before the microbe is killed.

The Examiner has rejected the claims under 35 U.S.C. 103 over Omura, alone or in view of Smith III. Neither of these references disclose or suggest a process to make an antimicrobially protected product under the conditions of the present invention. In fact, Omura discloses the application of their antimicrobial agent to a cloth, followed by drying at 135°C, and further heat treatment at 165°C for 2 minutes (see Examples 1-3 bridging paragraphs 11 and 12). Omura further discloses at column 8, lines 13-17 that their treated

fabric is dried at temperatures from 100-150°C. However, the present invention requires that the drying step be at temperatures from 50-90°C. This provides two advantages. Namely this provides the present invention antimicrobial the ability to form the above noted coating on the fiber/fabric/article and permits the process to be performed under significantly milder conditions, suitable even for performing by a consumer in a household washer and dryer.

Smith III cannot overcome the deficiencies of Omura, since Smith specifically requires that their treated fabric be dried at a temperature of 320-420°F (160-215°C!). Additionally, the methods disclosed by Smith III are for providing FLAME RETARDANT fabrics, not antimicrobial per se. The only examples provided by Smith which use an antimicrobial agent are Examples 2, 4, 6 and 8, which require temperatures for drying of from 375°F to 380°F. That cannot suggest the mild drying conditions of the present invention!

There is nothing within the two references to suggest that one could perform a method as required in the present invention, requiring a drying temperature of the treated yarn/fabric/article of from 50-90°C, and expect to obtain not only antimicrobial treatment, but also such treatment that would last for many, many wash cycles. The present invention method provides the ability to readily make any yarn/fabric/article antimicrobial under conditions mild enough to be performed at home by the consumer using conventional washer and dryer equipment. (Applicants note that the process can also be performed in an industrial setting using much milder conditions, making the work environment for the employee much more pleasant, since the much hotter temperatures of the prior art are not required!). As such, the references cannot combine to render the present invention obvious and the rejections should be withdrawn.

The rejection under 35 U.S.C. 112 is not understood. The Examiner states that it is unclear what is meant by a "continuous process", then proceeds to state that the Examiner has interpreted a continuous process to be a process which has steps carried out in a sequence

over a specific timeframe. EXACTLY! Applicants have noted in the present application at page 6, beginning at line 21, that the present method can be performed as a batch process or in a continuous type process. Further Applicants have stated that within the context of the present invention, a continuous type process includes not only a truly continuous process but also semi-continuous processes which may require periodic stops for product changes, other line modifications, etc. In the fiber industry, it is common to have a continuous process for formation of yarns or fabrics, wherein the yarn or fabric is formed along a series of equipment/machines, with the yarn or fabric being guided and transported through series of rollers, nips, or guides. Further, it is common practice to have one or more liquid treatment baths along those processes through which the yarn or fabric is passed to apply the liquid, such as sizing treatments, etc. This is well known to those of ordinary skill in the fibers area. Since the use of the term "continuous process" is described in the specification, and further carries its ordinary everyday meaning to those of ordinary skill in the art (as evidenced by the Examiner's interpretation), this rejection is respectfully traversed and should be withdrawn.

Applicants submit that the application is in condition for allowance and early notification of such action is earnestly solicited.

Respectfully submitted,

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